Remarks

Claims 25-28, 30-31, 32-35, 37-38, 39-40, and 42-43 were rejected under 35 USC §103(a) as being unpatentable over Fei (2004/0067741) in view of Jones (6,876,675) and in further view of Parish (5,930,243).

The Applicants' specification provides for a method and apparatus for frequency offset compensation within a communication system. In order to assist in frequency offset compensation, the Applicants transmit a frequency synchronization burst. As stated in paragraphs 57 and 58 of the published patent application, bits within the synchronization burst are used to represent the frequency offset of the burst. For example, as stated in paragraph 57, in an 8-bit header, "seven bits may represent . . . time and frequency position information".

Fundamentally, our claims specifically cover sending the time/frequency offset information as data bits in the burst. All of the cited art describes measuring frequency offsets. We do not claim the measurement of frequency offsets. We claim the sending of synchronization bursts. When a remote unit receives these bursts, the data payload in the burst specifies the offset between the sync burst and the subsequent data packet.

In rejecting the Applicants' claims, Examiner Ho combines three references. Particularly, Examiner Ho states that Fei discloses transmitting synchronization bursts, but is silent as to each burst containing bits identifying a frequency offset. Examiner Ho states that this element can be found in Jones. Finally, Examiner Ho states that the combination of Fei and Jones is silent as to disclosing that each burst is transmitted at a particular, but differing frequency offset from a center frequency.

1. Fei fails to teach or otherwise suggest the transmission of synchronization bursts:

Fei fails to teach or otherwise suggest the transmission of synchronization bursts. Particularly, Fei describes a process where a first device (base station) estimates or measures its frequency offset from a second device (mobile station) and then adjusts its frequency or sends information about the estimated offset to the second device. It fact is evident in paragraph 0036 of Fei, where he states that "a base station may usually be designed with better components, . . . resulting in better frequency offset estimation . . ."

In summary, Fei discloses a system where a first device receives communications from a second device. The first device can estimate, or measure the frequency offset of the received transmissions. However, Fei is silent as to the transmission of synchronization bursts.

2. Jones fails to teach or otherwise suggest the use of data bits to convey frequency offset of a burst.

All claims have been amended to include the limitation that synchronization bursts contain bits representing frequency position information for the burst. Analysis of the prior art reveals that the prior art fails to teach or otherwise suggest this limitation.

The Examiner states that in col. 5, lines 19-21, Jones discloses that each frequency synchronization burst contains information regarding its particular frequency offset. Here, Jones states that a "supplemental cyclic prefix" can be used "to acquire burst and timing frequency offset." The Applicants contend that a "supplemental cyclic prefix" is not bits representing frequency position information. Particularly, in col. 5, lines 58-64, Jones reveals that his supplemental cyclic prefix contains a duplicate of transmitted time-domain symbols. Particularly, Col. 6, lines 58-64 state:

> FIG. 5 is a diagram of an OFDM burst 500 according to one embodiment of the present invention. OFDM burst 500, as depicted... includes a v length cyclic prefix 502 and a supplemental cyclic prefix 504 having length L. **Together, v length cyclic prefix 502 and supplemental cyclic prefix 504 duplicate the last v+L of N time domain symbols.** (Col 6, lines 58-64, *emphasis added*)

The frequency offset of Jones is then found to be:

$$f_{offset} = \frac{1}{2\pi M}\tan^{-1}\frac{\mathrm{Im}\overline{d}(\delta^{opt})}{\mathrm{Re}\overline{d}(\delta^{opt})}$$

Thus, as taught by Jones, the supplemental cyclic prefix used for acquiring burst and timing frequency offset, contains only a repetition of time domain symbols. ***These time domain symbols do not represent frequency position information for the burst, as claimed by the Applicants.***

3. Parish fails to teach or otherwise suggest that each burst is transmitted at a particular, but differing frequency offset from a center frequency.

Parish fails to teach or otherwise suggest that each burst is transmitted at a particular, but differing frequency offset from a center frequency. Examiner Ho states that this claimed element can be found in FIG. 3, and in Co. 9, lines 55-60. Analysis of this section reveals that this section is silent as to each burst being transmitted at a particular, but differing frequency offset from a center frequency. In particular, this section simply mentions that bursts are used "in which the known property is a known format, in order to estimate the time alignment, frequency offset, and initial weight vector W_r parameters."

4. Jones, and Parish actually teach away from their combination.

The Applicants respectfully disagree with Examiner's contention that the above combination of references would meet the "obvious" requirement under 35 USC §103. Inspection of Jones and Parrish reference reveals that these references teach some form of frequency offset compensation. In particular, Jones teaches the use of a "supplemental cyclic prefix" to aide in frequency offset compensation, while Fei teaches the use of a "cost function" (Col, 10, lines 10-13) to determine the frequency offset estimates. The combination of Jones and Parish would result in a communication system where both a cyclic prefix and a cost function are used to estimate a frequency offset. Clearly, since each method alone (i.e., using the cyclic prefix or using the cost function) would

compensate the system, the combination of Jones and Parish would result in an unnecessary step taken for frequency offset compensation. Thus, both references actually teach away from combination since if one followed the teaching of one reference, they would be persuaded not to attempt combination with the other reference since it would result in a communication system performing an unnecessary step to perform frequency compensation.

Summary

In summary, the Applicants specifically claim the fact that their synchronization burst contains bits representing frequency position information for the burst and that each burst is transmitted at a particular frequency offset from a center frequency. The Examiner states that these limitations can be found in the combination of Fei, Jones, and Parish. However, analysis of these references reveals that this is not the case. Therefore, all claims are allowable over the prior art of record.

No amendment made was related to the statutory requirements of patentability unless expressly stated herein; and no amendment made was for the purpose of narrowing the scope of any claim, unless Applicant has argued herein that such amendment was made to distinguish over a particular reference or combination of references. As the Applicant has overcome all substantive rejections given by the Examiner the Applicant contends that this Amendment, with the above discussion, overcomes the Examiner's rejections to the pending claims. Therefore, the Applicant respectfully requests allowance of the application. If the Examiner is of the opinion that any issues regarding the status of the claims remain after this response, the Examiner is invited to contact the undersigned representative to expedite resolution of the matter. Finally, please charge any fees (including extension of time fees) or credit overpayment to Deposit Account No. 502117.

Respectfully Submitted,
Gorday, ET AL.

by: 

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